SVKM's
D. J. Sanghvi College of Engineering

Program: B.Tech in Computer Science and Engineering (IOT and Cyber Security with Block Chain Technology **Academic Year: 2022** **Duration: 3 hours**
Date: 21.01.2023
Time: 09:00 am to 12:00 pm
Subject: Data Structures (Semester III) **Marks: 75**

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover page of the Answer Book, which is provided for their use.
(1) This question paper contains two pages.
(2) All Questions are Compulsory.
(3) All questions carry equal marks.
(4) Answer to each new question is to be started on a fresh page.
(5) Figures in the brackets on the right indicate full marks.
(6) Assume suitable data wherever required, but justify it.
(7) Draw the neat labelled diagram, wherever necessary.

Question No.		Max. Marks
Q1 (a)	Write a program to implement circular linked list for following, a) Insert an element after given element of the list. b) Delete Last node of the list. c) Display all elements of the list. **OR** Write a program to implement Doubly Linked List. Perform the following operations: a) Insert a node in the end of link list. b) Delete a specified node from the list. c) Display the all elements of the list.	[15] [15]
Q2 (a)	Explain priority queue with example	[05]
Q2 (b)	Explain following algorithms with suitable example. a) Quick Sort b) Shell Sort. **OR** Explain following algorithms with suitable example . a) Insertion sort b) Radix Sort.	[10] [10]
Q3 (a)	Write a program to implement Linear Queue using array. **OR** Implement a program to check whether a giving string is palindrome or not using Stack .	[10] [10]
Q3 (b)	Explain BFS with suitable example.	[05]

Q4 (a)	Explain insertion and deletion operation with example in Binary Search Tree (BST). Show BST for the following input: 10, 5, 4, 12, 15, 11, 3 **OR** Draw a binary tree for the following sequence: In-order sequence: 4, 7, 2, 8, 5, 1, 6, 9, 3 Pre-order sequence: 1, 2, 4, 7, 5, 8, 3, 6, 9	[08] [08]
Q4 (b)	What is hashing? Hash the following data in table of size 20 using linear probing and quadratic probing. Also find the number of collisions. {96, 48, 63, 29, 87, 77, 48, 65, 69, 94, 61}	[07]
Q5 (a)	Write a program to implement addition of two polynomials equation. (Assume suitable polynomials equation) **OR** Draw diagram to show difference stages during the building of AVL tree for following sequence of keys: A,Z,B,Y,C,X,D,U,E. In each case show the balanced factor of all the nodes and name type of rotation used for balancing.	[10] [10]
Q5 (b)	Explain In order Traversal Techniques with example.	[05]